1. (Amended) A position sensor for sensing position of a diffusely scattering surface comprising:

a source of coherent illumination which illuminates the diffusely scattering surface with first and second input beams angled toward the surface forwardly and rearwardly, respectively, relative to surface motion;

a fringe detector; and

optics to direct light, scattered from the surface in [forward and] rearward and forward directions, respectively, relative to surface motion, to the detector to form a fringe pattern in the plane of the detector resulting from interference of diffusely scattered light, movement of the surface being detected by the fringe detector through movement of the fringe pattern.

3. (Amended) A position sensor as claimed in claim 2 wherein the input beams illuminate and the fringe pattern is derived from a common spot of the diffusely scattering surface.

13. (Amended) A position sensor for sensing position of a diffusely scattering surface comprising:

a source of coherent illumination which illuminates a spot of the diffusely scattering surface with separate polarized input beams from forward and reverse directions, respectively;

a fringe detector; and

optics to direct light, backscattered from the surface, to form a fringe pattern in the plane of the detector resulting from interference of diffusely scattered light, backscattered light being isolated from specularly reflected light through polarization filters.